REMARKS

It is believed that the above amendments and following remarks attend to each and every rejection and objection presented in the pending February 24, 2005 office action. Claims 1, 2, 4-11, 13-19, 21-30 and 32-34 remain pending, with claims 1, 18 and 25 being independent.

Specification

Corrections to the specification were previously presented in Applicants' response submitted November 4, 2004. As the Examiner's objection remains in the currently pending action, a version showing markings as well as a version without markings are submitted in the present response.

The final paragraph of page 13, starting "An advantage of a preferred..." is amended to insert a missing line, caused by a printing error, between pages 13 and 14. Support for the amendment is found on page 3, lines 18-19 of U.S. Provisional Application No. 60/272,747, filed March 1, 2001, from which this application claims benefit and which is incorporated by reference into the present application. In particular, U.S. Provisional Application No. 60/272,747 states "when ice grows on the power line or other surface being protected, the electric field between the conductor and the ice increases, reaching a plasma ignition threshold."

Claim Rejections

Claims 1-10 and 18-32 stand rejected under 35 U.S.C. § 102(b) as being anticipated by the background of the specification or the Gemini article pp. 1-3, December 1996 (hereinafter "Gemini article").

To anticipate a claim, the immediate background and the Gemini article must teach every element of the claim and "the identical invention must be shown in as complete detail as contained in the ... claim." *MPEP 2131* citing *Verdegaal Bros. V. Union Oil Co. of California*, 814 F.2d 628, 2 USPQ2d 1051 (Fed. Cir. 1987) and *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 9 USPQ2d 1913 (Fed. Cir. 1989). The immediate background and the Gemini article do not teach every element of Applicants' amended claims.

The Examiner asserts that it is common knowledge that ice can form, and corona and plasma discharge can occur, on a power line. The Examiner suggests that "a small layer of air between the ice and the current carrying conductors" would create a system which would

perform according to an embodiment of the present invention. Applicant respectfully points out ice is electrically isolated from the power cable in order for plasma discharge to occur. In the absence of isolation, ice growth on a bare cable acts as a conductor, effectively increasing the diameter of the cable and reducing the probability of corona discharge. The present application discloses plasma formation between the conductor and an outer shell that forces electrical isolation of the ice and the power cable.

In the immediate application, "'gas-filled layer' and related terms refer to a layer containing one or a plurality of **enclosed volumes** *[emphasis added]* of a plasma-forming gas," see page 7, lines 13-15. Thus the gas-filled layer has a specific structure to enclose the plasma-forming gas. This specific structure is recited in the amended claims as "a permanent outer shell"; see page 9, lines 9-21 and original claim 12. No new matter has been added by these amendments. The immediate background and the Gemini article do not disclose or suggest a structure around the gas-filled layer, thus they do not anticipate Applicants' amended claims.

Claim 1 recites a system for melting ice that includes an electrical conductor for generating an AEF in response to an AC voltage, a gas-filled layer proximate to the electrical conductor, the gas-filled layer containing a plasma-forming gas for forming a plasma in response to an AEF and a permanent outer shell, wherein the gas-filled layer is disposed between the electrical conductor and the permanent outer shell. The system of claim 1 specifically requires a structure, namely a permanent outer shell, for enclosing the gas between the electrical conductor and the permanent outer shell; see for example, FIG.3 and page 9, lines 9-21, of the immediate application. This structure is not anticipated by the formation of an ice layer, which may form and then disappear (i.e., melt), nor is it disclosed or suggested by the immediate background or by the Gemini article.

Reconsideration of claim 1 is requested.

Claims 2 and 4-10 depend from claim 1 and benefit from like arguments; but in addition these claims have other features that patentably distinguish over the immediate background and the Gemini article. For example, claim 2 recites the permanent outer shell comprises a conductive layer. Claim 4 recites that ice on the permanent outer shell forms a conductive layer. As shown in FIG. 3 and described on page 9 of the immediate application, the conductive layer is insulated from the conductor by the gas-filled layer. Nowhere does the immediate background

or the Gemini article disclose or suggest a permanent outer shell comprising a conductive layer. Claim 10 recites that the gas-filled layer comprises a gas selected from the group consisting of air, nitrogen and argon. Nowhere does the immediate background or the Gemini article teach or suggest the use of nitrogen and/or argon as the plasma-forming gas.

Reconsideration of claims 2 and 4-10 is requested.

Claim 18 recites a system for generating heat, including an electrical conductor for generating an AEF in response to an AC voltage, a gas-filled layer proximate to the electrical conductor, the gas-filled layer containing a plasma-forming gas for forming a plasma in response to an AEF, an AC power source for applying an AC voltage to the electrical conductor and a permanent outer shell, wherein the gas-filled layer is disposed between the electrical conductor and the permanent outer shell. Again, the system of claim 18 specifically requires a structure for enclosing the plasma-forming gas (a permanent outer shell); see for example, FIG.3 and page 9, lines 9-21 of the immediate application. This structure is not disclosed or suggested by the immediate background or by the Gemini article. Thus, claim 18 cannot be anticipated by the immediate background or the Gemini article.

Reconsideration of claim 18 is requested.

Claims 19 and 21-24 depend from claim 18 and benefit from like arguments; but these claims have additional features that patentable distinguish from the immediate background and the Gemini article. For example, claim 19 recites the permanent outer shell comprises a conductive layer. Nowhere does the immediate application or the Gemini article teach or suggest a permanent outer shell comprising a conductive layer.

Reconsideration of claims 19-24 is respectfully requested.

Claim 25 recites a method for melting ice, including a step of generating an AEF in a gas-filled layer proximate to the ice for causing electric breakdown of gas and the formation of plasma in the gas-filled layer, wherein the gas-filled layer is disposed between an electrical conductor and a permanent outer shell. As specified by the definition of the "gas-filled layer" on page 7, lines 13-15, of the immediate application, this layer is enclosed. As argued above, nowhere does the immediate background or the Gemini article teach of an enclosed gas-filled layer disposed between an electrical conductor and a permanent outer shell.

Reconsideration of claim 25 is respectfully requested.

Claims 26-30 and 32 depend from claim 25 and benefit from like arguments; but in addition these claims also have other features that patentably distinguish over the immediate background and the Gemini article. For example, claim 32 recites that ice on the permanent outer shell forms a conductive layer. Nowhere does the immediate background or the Gemini article teach or suggest that ice on a permanent outer shell forms a conductive layer.

Reconsideration of claims 26-30 and 32 is respectfully requested.

Claim Rejections – 35 U.S.C. § 103

Claims 11, 13 and 15 are rejected under 35 U.S.C. § 103(a) as being unpatentable over the immediate background or the Gemini article.

To establish a *prima facie* case of obviousness, three basic criteria must be met.

> **First**, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the references or to combine reference teachings.
>
> **Second**, there must be a reasonable expectation of success.
>
> **Finally**, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on Applicant's disclosure. MPEP § 2143, *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991)

As argued above in connection with the independent claims, the immediate background and the Gemini article do not and cannot disclose each and every element of claim 1; the immediate background and Gemini article therefore also fail to render claims 11, 13 and 15 obvious under 35 U.S.C. §103. These claims provide additional reasons for patentability.

For example, claim 11 recites that the gas-filled layer has a thickness in a range of about from 0.5 to 10 mm. As the immediate background and the Gemini article fail to disclose a gas-filled layer disposed between an electrical conductor and a permanent outer shell, they cannot teach or suggest that the thickness of that layer would be in a range of about from 0.5 to 10 mm.

Claim 15 depends from allowable claim 12 (the subject matter of which is now incorporated into claim 1) and, for at least that reason, should be allowable. Claim 15 teaches of a switch for electrically shorting the electrical conductor and the conductive permanent outer shell. The plasma formation process of the present "system is turned "off" by closing the switch, which electrically shorts the electrical conductor and the outer shell, thereby reducing the electric field strength in the gas-filled layer to substantially zero and practically preventing electric breakdown and discharge." See page 12, lines 17-20 of the immediate application. Thus, the switch of claim 15 turns the plasma formation mechanism, not the power, on and off. Contrary to the Examiner's suggestion, switching the power from off to on does not have the same function as the switch of claim 15. Claim 15 requires that a switch connects the conductive outer shell to the conductor. Clearly, this switch does not connect or disconnect power to or from the conductor as suggested by the Examiner.

Claim 13 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over the immediate background of the invention or the Gemini article in view of UK Patent No.1096087 (hereinafter "UK'087") on page 3 of the pending office action, but is also included as allowable subject matter because it includes "an actual outer conductive shell" (page 5 of the present office action). We contend that claim 13 is allowable for at least the reason cited in the Examiner's action and for the following reasons.

UK'087 discloses that "to overcome the problem of corona, a continuous coating of plastic material 16 is applied to the insulator 13 and the conductor 12 to provide an unbroken surface on the insulator and the conductor as shown in FIG. 3." See UK'087 page 2, column 1, lines 7-12. Claim 13 recites that the permanent outer shell is electrically nonconductive and requires that the gas-filled layer is disposed between the electrical conductor and the permanent outer shell (see claim 1). UK'087 only discloses a solution to "overcome the problem of corona" and does not disclose or suggest a solution to icing of power lines. It would, therefore, not have been obvious to use UK'087 in view of the immediate background and the Gemini article to provide a solution for deicing power lines. Further, the insulator disclosed by UK'087 is continuous and applied directly to the conductor and does not include a gas-filled layer.

Reconsideration of claims 11, 13 and 15 is requested.

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Conclusion

Claims 1, 2, 4, 13-15, 17-19, 25 and 32-33 have been amended to recite a permanent outer shell, the gas-filled layer disposed between the electrical conductor and the permanent outer shell. This amendment simply incorporates the allowable subject matter of claim 12 into the independent claims. No new matter has been added.

Claims 3, 12, 20 and 31 are cancelled. The subject matter of these claims has been incorporated into other claims. Claim 34 is new. Claim 34 depends from claim 25 and recites subject matter similar to that of claim 2. No new matter has been added by these amendments.

We thank the Examiner for his indication of allowable subject matter. Reconsideration and allowance of all claims is respectfully requested. Should any questions arise, the Examiner is encouraged to telephone the undersigned attorney.

It is believed that no fees are due in connection with this amendment. If any fee is due in connection with this matter, please charge Deposit Account No. 12-0600.

Respectfully submitted,
LATHROP & GAGE L.C.

Date: 4-20-05

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SPECIFICATION – VERSION SHOWING MARKINGS

Please amend the final paragraph beginning on line 24 of page 13 and ending on line 7 on page 14, starting "An advantage of a preferred..." to insert a missing line:

An advantage of a preferred de-icing system or method in accordance with the present invention is that it does not need a switch or "control" box to turn the heating "on" or "off". When ice grows on the power line or other surface being protected, the AEF between the conductor and the ice increases, reaching an electric breakdown and plasma-formation level. This is because ice is a better conductor than air. When ice is present, the electric field strength in the gas-filled layer is higher than in the absence of ice. After the ice melts, the field strength within the gas-filled layer decreases, virtually stopping electric breakdown and discharge, with a corresponding reduction in energy consumption. The pressure of the gas in the gas-filled layer can be adjusted to such a level that electric breakdown starts only when the ice thickness reaches a certain value, such as 0.5 cm or 2 cm or any other desired dimension.